

**WHAT WE CLAIM IS:**

**CLAIM 1.** A method of treating biomass contained in municipal or industrial biological wastewater treatment sludge, paper-pulp sludge, animal or plant waste sludge, containing intra-cellular water molecules contained in molecular cellular units of the biological waste sludge, comprising:

- (a) directing the biomass to an electroporating station;
- (b) electroporating the biomass for destroying at least most of the individual cellular units of the biomass in order to release the intra-cellular water molecules contained therein; and  
said step (b) causing massive disruption of the cellular matter, allowing for the release of bound as well as intra-cellular liquids and intracellular dissolved/organic matter; and
- (c) directing the released intracellular dissolved/organic matter to a bioreactor for performing biological digestion thereon whereby the intracellular, dissolved organic matter is used as food for the bacteria in the biological reactor, whereby the biological digestion process is accomplished.

**CLAIM 2.** The method according to claim 1, wherein said step(c) comprises delivering the destroyed biomass of said step (b) to at least one of: an aerobic, anoxic, facultative, or anaerobic bioreactor.

**CLAIM 3.** The method according to claim 1, further comprising, before said step

(a):

- (d) transporting wastewater from a primary treatment apparatus to at least one bioreactor of a secondary treatment apparatus;
- (e) said step (c) comprising recycling the released intracellular dissolved/organic matter back to said at least one bioreactor of said step (d).

**CLAIM 4.** The method according to claim 3, wherein said step (e) comprises delivering the destroyed biomass of said step (b) to one of: an aerobic, anoxic, facultative, or anaerobic bioreactor.

**CLAIM 5.** The method according to claim 3, wherein said secondary treatment apparatus further comprises a sludge dewatering apparatus; said step (c) further comprising;

(f) delivering the destroyed biomass of said step (b) to another bioreactor downstream from said at least one bioreactor and upstream of said sludge dewatering apparatus.

**CLAIM 6.** The method according to claim 5, wherein said step (f) comprises delivering the destroyed biomass of said step (b) to one of: an aerobic, anoxic, facultative, or anaerobic bioreactor.

**CLAIM 7.** The method according to claim 1, wherein said secondary treatment apparatus further comprises a sludge dewatering apparatus; said step (c) further comprising delivering the destroyed biomass of said step (b) to a bioreactor upstream of said sludge dewatering apparatus.

**CLAIM 8.** A method of treating wastewater comprising:

- (a) delivering said wastewater to at least one bioreactor;
- (b) digesting the waste water in said bioreactor, said bioreactor digesting the waste water to create a waste biological sludge including a plurality of cellular units and bound intracellular dissolved organic matter;
- (c) delivering said waste biological sludge to an electroporation apparatus;
- (d) electroporating said waste biological sludge in said electroporation apparatus by exposing said waste biological sludge to a pulsed electric field to disrupt said cellular units and to release said bound intracellular dissolved organic matter; and
- (e) delivering said dissolved organic matter to at least one of: said at least one bioreactor and an alternative bioreactor for reaction therewith;  
said step (e) comprising supplying said dissolved organic matter as food for said at least one bioreactor or said alternative bioreactor whereby the bioreactor digestion process is thus enhanced.

**CLAIM 9.** The method according to claim 8, wherein said step (e) comprises delivering said dissolved organic matter to at least one of: an aerobic, anoxic, facultative, or anaerobic bioreactor.

**CLAIM 10.** The method according to claim 8, further comprising:

(f) thickening said waste biological sludge before said step (d).

**CLAIM 11.** The method according to claim 8, further comprising:

(f) clarifying said waste biological sludge before said step (d).

**CLAIM 12.** The method according to claim 8, further comprising:

(f) after said step (e), delivering the digested waste biological sludge of said alternative bioreactor to a sludge-dewatering device for forming filter cakes thereby.

**CLAIM 13.** The method according to claim 12, wherein said step (e) comprises delivering said dissolved organic matter to said alternative bioreactor consisting of one of: an aerobic, anoxic, facultative, or anaerobic bioreactor.